SYNTHESIS, CHARACTERIZATION, AND OPTIMIZATION OF SITOSTEROL IMPRINTED POLYMERS USING TFMAA AS FUNCTIONAL MONOMER

Abstract

Synthesis of Molecularly Imprinted Polymers (MIP) has been conducted using trifluoromethylacrylic acid (TFMAA) as a functional monomer, trimethylolpropane trimethacrylate (TRIM) as a cross-linker, 2,2'-azobis isobutironitril (AIBN) as an initiator, and toluene as porogen solvent, and sitosterol as template molecule. The MIP was synthesized using imprinting molecular technique through polymerization process. The template molecule was used as a porous template on polymer to form MIP. The polymer could be applied as the high affinity adsorbent for sitosterol. Therefore, sitosterol compound as a template molecule was selected to print the cavities in the polymer. Functional groups and the morphology of MIP were determined by using Fourier Transform Infrared (FTIR) spectrophotometer and Scanning Electron Microscopy (SEM), respectively. The ability to adsorb sitosterol was optimized with variables of contact time and pH using high performance liquid chromatography (HPLC). Functional groups involved in the formation of MIP were O-H, C=C, C=O and C-F. The surface morphology of MIP was coarser and more porous than that of NIP. The adsorption of sitosterol in MIP achieve the optimum at a pH of 6 and a time of 60 minutes. The amount of sitosterol adsorbed in MIP was higher than that in NIP. The adsorption sitosterol in MIP followed the pseudo second order kinetic model with a rate constant (k2) of 1.7895 g min-1 mg-1.

Key words : Molecularly imprented polymers, functional monomer, cross linker, optimization, and B-sitosterol